Space Weather Forecast

Issued on Monday, 18 March 2024 at 13:05 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of isolated Moderate flares (R1-R2 Radio blackouts). Slight chance G1 from coronal mass ejection arrival later on day 3 (20 Mar)

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Moderate activity in the past 24 hours, with Moderate-class flare originating from a sunspot region near the northwest limb at 18/0313UTC, which has now rotated off the disc. An additional Moderate-flare was also observed at 18/0414UTC from a large and complex sunspot region near the northeast limb. There are currently seven sunspot regions on the visible disc. The sunspot region in the northwest is the largest and most complex with a clear delta configuration, and with further detail potentially becoming visible as it moves into a less oblique viewing angle. The next largest region is located in the southwest, but of a relatively simple bipolar magnetic type. The new sunspot region in the southeast is of note, as a source of the most frequent ongoing Common-class flares. However this is currently at too oblique an angle for an accurate analysis. The remaining sunspot regions on the disc have remained stable.

A broad filament (line of plasma on the Sun that can be a source of coronal mass ejections) was observed erupting from the southwest disc, splitting to give two identifiable coronal mass ejections. The first has been analysed as faster and narrow, and likely to miss to the south, but with a chance of a glancing arrival on day 3 (20 Mar). The second was wider and slower, but more likely to arrive, currently expected later on day 3 (20 Mar). No other Earth-directed CMEs were observed.

Solar Wind / Geomagnetic Activity: Solar winds were indicative of slow wind conditions, with the speed observed at background, easing from 350 km/s to below 300 km/s. Total Interplanetary Magnetic Field was weak, with the north-south component also weak and mainly positive (northward). Geomagnetic activity was Quiet (Kp=0 throughout).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) remained slightly above the background level, but easing, after the S1 Minor solar radiation storm on 15-16 Mar.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate activity expected with a chance of isolated Moderate class flares. These most likely from the new region in the southeast, or the returning region in the northeast. There is a very slight chance of Strong-class flares.

Solar Wind / Geomagnetic Activity: Glancing CME arrivals are possible day 1-2 (18-19 Mar) but these are low confidence, and most likely to miss. A more likely arrival is then expected day 3 (20 Mar), most likely from the slower of the two CMEs from the filament eruption on 17 Mar, but perhaps also a glancing impact from the slightly fast and further south CME earlier in the day. No other notable enhancements are forecast. Geomagnetic activity is forecast to be mainly

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Quiet, but increasing to give periods of Unsettled to Active with any CME glance that occurs, most likely with on day 3 (20 Mar), with a slight chance of G1 Minor Storms.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is expected to continue easing to background with only a very slight chance of further enhancements during the forecast period.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	5	40	20
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	50	50	50	50
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1

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Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	5	5	5	5
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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